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Case Report

Rapid development of squamous cell carcinoma at a split-thickness skin graft donor site

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Abstract: The development of a Marjolin ulcer at the site of a split-thickness skin graft donor site is exceptionally rare. Here we describe the rapid development of squamous cell carcinoma at a split-thickness skin graft donor site in the setting of severe burn. We present a case of a 52-year-old male with no past medical history who presented with a 24% total body surface area burn caused by a flash flame. Four months after his initial excision and grafting, he presented for revision of a burn scar with an additional complaint of a rapidly developing skin lesion at his donor site, which arose over 2 weeks. The lesion was excised *en bloc* and found to be invasive squamous cell carcinoma. There are 5 previous cases of squamous cell carcinoma development at the site of split-thickness skin harvest in the setting of severe burn. While the typical Marjolin ulcer has a latency period of up to 30 years, lesions that arise in split-thickness skin graft donor sites appear to have a rapid onset of weeks to months. Squamous cell carcinoma at the site of split-thickness skin grafting is an uncommon but important sequelae of burn care.

Keywords: Squamous cell carcinoma, burn, donor site

Introduction

A Marjolin ulcer, the eponym for a cutaneous malignancy which arises at the site of a chronic wound or scar, is a well-described phenomenon. Squamous cell carcinoma is the most frequent malignancy identified, although other cell types have been described (i.e., basal cell, melanoma). These lesions are typically aggressive and carry a poor prognosis if not identified and treated in a timely manner. The majority of Marjolin ulcers are seen in burn scars and the average latency period from time of wound to malignant degeneration is about 30 years [1]. The pathophysiology is not fully understood, but is likely due to a combination of chronic inflammation, poor vascularization, and decreased Langerhans cell activity allowing avoidance of immune detection by the developing lesion. The diagnosis of Marjolin ulcer is based on physical exam of an ulcerated, or occasionally exophytic, lesion at the site of a prior wound which is then confirmed with a biopsy. Treatment is wide local excision of the lesion with possible radiation therapy, and chemotherapy if complete excision is not possible [2].

The incidence of squamous cell carcinoma (SCC) at a split-thickness skin graft donor site (as opposed to primary burn wound site) is rare, with few cases described in the literature. Here, we describe the rapid development of SCC at a split-thickness skin graft donor site in the setting of severe burn with no known history of SCC.

Case report

A 52-year-old male with no past medical history presented to our burn center after sustaining 24% full-thickness and deep partial-thickness burns to the back, neck, forehead, and bilateral upper extremities from a flash flame. On hospital day 3, he underwent tangential excision with split-thickness skin grafting. The initial donor sites were the bilateral posterior thighs. A Zimmer dermatome was set at 0.010 of an inch. Skin was taken off bilateral thighs and meshed in a 4:1 fashion. After appropriate grafting, the donor sites were dressed with xeroform and bacitracin and gauze dressing. The dressings to these donor sites were changed on postoperative day 4. On hospital

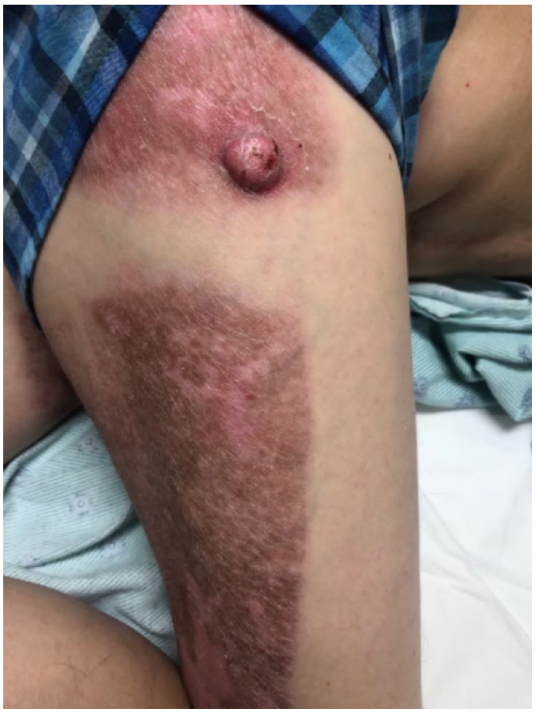

Figure 1. Right thigh squamous cell carcinoma at inferior edge of split-thickness skin graft donor site.

day 6, excisional debridement and split-thickness skin grafting was performed to the bilateral upper extremities. At this time, the left thigh was chosen as the harvest site and a split-thickness skin graft was taken from the left thigh using a Zimmer blade at 0.010 of an inch. The donor site was dressed with Mepilex. This donor site dressing was also changed on postoperative day 4. The patient experienced an uncomplicated initial hospital course and was discharged to inpatient rehabilitation on hospital day 17. Four months after his initial operation, he returned to the operating room for laser treatment of hypertrophic burn scars. Preoperatively, he noted a nodule on his right thigh within the scar of his previous split-thickness skin harvest site (**Figure 1**). He reported that it had arisen over the previous 2 weeks and was tender. The patient requested it be removed. The nodule was excised *en bloc* with an elliptical incision. The cutaneous surface of the specimen was found to have a 1.8 × 1.6 × 0.7 cm intradermal lesion which, on final pathology, was determined to be well-differentiated invasive SCC with 0.3 cm margins. The lesion was confined to the skin and no evidence of invasion to the subcutaneous tissue was seen. The resulting wound was closed primarily, and his postoperative course was complicated by small wound dehiscence which healed within two weeks. The diagnosis was discussed with the patient, and he was referred to a dermatologist for evaluation but unfortunately, he never followed up with dermatology or any other services at our hospital despite multiple attempts to reach him.

Discussion

A Marjolin ulcer refers to the occurrence of malignant degeneration at a chronic wound or scar, classically a burn scar [1]. This malignant transformation typically occurs after an extended latent period, averaging 30-35 years [2]. Clinicians should be suspicious for malignancy if exam finds a nonhealing, ulcerative, or indurated lesion appearing in a chronic wound or scar. Additionally, suspicion should be raised if a patient reports a rapidly growing lesion at the site of a scar. Diagnosis of a Marjolin ulcer is confirmed with a biopsy and the most widely accepted treatment is wide local excision only, although some clinicians have suggested a role for sentinel lymph node biopsy or even lymph node dissection. Radiation and chemotherapy are also recommended in some clinical situations. After treatment, close follow-up is necessary due to the high risk of recurrence of these lesions [3].

Eleven cases of the development of SCC at the site of skin harvest have been described, with only 5 cases occurring in the setting of a split-thickness skin harvest for burn treatment [2-10]. In the non-burn cases, the grafting was being done for the removal of SCC, and their authors have postulated that the later development of SCC was the result of iatrogenic or hematologic tumor spread rather than because of the skin harvest [4, 6-8]. In contrast, the burn patients described in the literature had no known other cancerous or pre-cancerous skin lesions noted during their grafting.

In the few cases of SCC in donor sites after burn surgery, descriptions of the initial burn injuries range from 2%-55% of total body surface area, affecting the torso and extremities. All affected donor sites that developed a Marjolin ulcer were in the lower extremities [5, 9, 10]. Of note, all described cases had rapid onset, with lesions developing within 6 months of skin harvest. In a series of cases described

by Noori et al., 2 of 3 patients developed lesions within 1 month, with the third developing the malignancy at 4 months after skin harvest [9]. Hammond et al. and Taylor et al. describe lesion onset at 6 and 5 weeks post-harvest, respectively [5, 10]. The current patient developed his malignant lesion within 4 months of his skin graft procedure. This rapid development is in stark contrast with the typical Marjolin ulcer latency period of 30 years [2].

Further research is needed to elucidate the mechanisms underlying the malignant transformation of Marjolin ulcers. Multiple theories of pathogenesis have been proposed, including persistent stimulation of marginal epithelium, reduced immune surveillance in the healing wound, elevated levels of proto-oncogenes, and genetic predisposition [1, 5, 9, 11]. Regardless of pathogenesis, SCC development in wounds carries a significant mortality at 21%-38% [2]. While mortality secondary to carcinoma of a skin harvest site has yet to be described, early identification and definitive management is critical.

Conclusion

The development of SCC at skin graft donor sites is a rare but significant sequelae of burn care, with only a few cases described in the literature. This case highlights the need to remain vigilant in the postoperative period, paying close attention to the donor site during follow up-examinations. Provider awareness and patient education may aid in early detection and treatment of this condition.

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Informed consent was obtained from the patient.

Disclosure of conflict of interest

None.

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